UNITED STATES PATENT AND TRADEMARK OFFICE

H'A

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/829,364	04/22/2004	Akifumi Yagaguchi	0020-5252PUS1	7085

2292 7590 08/25/2006

BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH, VA 22040-0747

EXAMINER	
WYATT, KEVIN S	

ART UNIT	PAPER NUMBER
2878	

DATE MAILED: 08/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/829,364	YAGAGUCHI ET AL.	
	Examiner	Art Unit	
	Kevin Wyatt	2878	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 07 June 2006.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-15 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-5 and 7-15 is/are rejected.

7)☒ Claim(s) 6 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is in response to the Amendment after non-final, and remarks filed on 06/07/2006. Currently, claims 1-15 are pending.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 3-5, 7-8, 10-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Ueda (U.S. Patent No. 5,796,470).

Regarding claim 1, Ueda shows in Figs. 1A-B, 2A, and 2B-C, an optical moving amount detecting device comprising: a light emitter (1, i.e., light source element or semiconductor laser, col. 4, lines 23-24), a light receiver (9, i.e., photo detector, col. 4, line 44), a first optical system (combination of lens units (11) and (12), and electro-optic elements 15a-b, col. 4, lines 31-41) for making light from the light emitter into a linear beam (beams 14a and 14b in Fig. 2A or 5a and 5b in Fig. 2B which are made linear in part by electro-optic elements 15a-b) having a length and a width, the length extending in parallel with a direction of movement detection object and casting the linear beam on the detection object, a second optical system (combination of condenser lens (8) and lens unit (12), col. 4, line 43) by which a linear reflected beam that linear beam reflected (plurality of parallel beams (3), col. 1, lines 44-46) from the detection object made incident on the light receiver (col. 1, lines 44-58), a storage unit (storage means within

signal processing means, col. 11, lines 1-7) for storing first output waveform signals that are outputted from the light receiver(9, i.e., photo detector) receiving the linear reflected beam (14a and 14b during initial displacement) at a first time point and that represent an output distribution of the linear reflected beam along longitudinal direction thereof and storing second output waveform signals that are outputted from the light receiver receiving the linear reflected beam (14a and 14b during a second displacement) a second point and that represent an output distribution of the linear reflected beam along the longitudinal direction (signal processing means inherently stores the displacement of the object at some point in order to calculate object's velocity) thereof, and a moving amount detecting unit (signal processing means, col. 11, lines 1-7) (see formulas 8 and 14) detecting an amount of shift between the first output waveform signals and the second output waveform signals in the longitudinal direction of the linear reflected beams and detecting a moving amount of the detection object on basis of the amount of shift (col. 6, lines 30-51).

Regarding claim 15, Ueda shows in Figs. 1A-B, 2A, and 2B-C, an optical moving amount detecting device comprising: a light emitter (1, i.e., light source element or semiconductor laser, col. 4, lines 23-24), a light receiver (9, i.e., photo detector, col. 4, line 44), a first optical system (combination of lens units (11) and (12), and electro-optic elements 15a-b, col. 4, lines 31-41), including at least one first lens (15a-b, i.e., electro-optic elements), for making light from the light emitter into a linear beam having a length and a width, the length extending in parallel with a direction of movement of a detection object and casting the linear beam on the detection object (7), a second optical system

(combination of condenser lens (8) and lens unit (12), col. 4, line 43), including at least one second lens (8, i.e., condenser lens), by which a linear reflected beam that is the linear beam (plurality of parallel beams (3), col. 1, lines 44-46) reflected from the detection object is made incident on the light receiver (9, i.e., photodetector)(col. 1, lines 44-58), a storage unit (storage means within signal processing means, col. 11, lines 1-7) for storing first output waveform signals (5a) that are outputted from the light receiver (9, i.e., photo detector) receiving the linear reflected beam (14a and 14b during initial displacement) at a first time point and that represent an output distribution of the linear reflected beam along a longitudinal direction (x coordinate, see Fig. 2B) thereof and storing second output waveform signals that are outputted from the light receiver receiving the linear reflected beam (14a and 14b during a second displacement) at a second time point and that represent an output distribution of the linear reflected beam along the longitudinal direction (signal processing means inherently stores the displacement of the object at some point in order to calculate object's velocity) thereof, and a moving amount detecting unit (signal processing means, col. 11, lines 1-7) (see formulas 8 and 14) for detecting an amount of shift of an output pattern appearing in the first output waveform signals based on an output pattern that is substantially identical appearing in the second output waveform signals in the longitudinal direction of the linear reflected beams and detecting a moving amount of the detection object on basis of the amount of shift (col. 6, lines 30-51).

Regarding claim 3, Ueda shows in Fig. 10 a deflector (131, i.e., mirror) for deflecting the linear reflected beam from the detection object (107, i.e., measured

object) provided between the first optical system (the optics system within laser (10)) and the detection object.

Regarding claim 4, Ueda shows in Figs. 2B-C, that the moving amount detecting unit comprises a waveform correcting section (25, i.e., multiplier) for multiplying parts of the first output waveform signals and of the second output waveform signals by a plurality of coefficients (see equations 1-3, for doppler shift and light grating pitch interference) according to a light intensity distribution of the linear beam with respect to a longitudinal direction linear beams and thus correcting the light intensity distribution of the linear beam with respect to the longitudinal direction (col. 1, lines 56-63 and col. 2, lines 1-34).

Regarding claim 5, Ueda shows in Figs. 2B-C, the moving amount detecting unit comprises a moving amount calculating section (combination of cpu (22), serodyne waveform generator (24), multiplier (25), and thermal conductor (19), col. 6, lines 66-67, and col. 7, lines 2-4) for determining correlation coefficients (see formulas 4-8) between first output waveform partial signals that are outputted the first time point from a first partial area corresponding part an image the linear reflected beam on the light receiver with respect to the longitudinal direction and plurality of sets second output waveform partial signals that are outputted the second time point from plurality partial areas corresponding a plurality of parts of an image of the linear reflected beam on the light receiver, determining a second partial area that results in a highest correlation coefficient at the second time point, and calculating the moving amount the detection

object on basis of an amount of shift between the first partial area and the second partial area (see formulas 1-8).

Regarding claim 7, Ueda shows in Figs. 2B-C, an optical moving amount detecting device as claimed in claim 5, wherein the size of the whole area of the light receiver is equal to a sum of the size of the first partial area (area of beam (14a)), the moving amount of the image of the linear reflected beam which amount corresponds to the predetermined moving amount the detection object (7), and a predicted amount of positional shift of the detection object from the moving amount (col. 1, lines 56-63).

Regarding claim 8, Ueda shows in Figs. 2B, electronic equipment (combination of cpu (22) A/D converter (21) D/A converter (23), multiplier (25) and thermal conductor (19) comprising the optical moving amount detecting device as claimed in claim 1.

Regarding claim 10, Ueda shows in Figs. 1A-B, 2A, and 2B-C, an optical movement detector detecting movement of a detection object comprising: a light emitter (1, i.e., light source element or semiconductor laser, col. 4, lines 23-24), a first optical system (11 and 12, i.e., lens units, col. 4, lines 31-33) projecting a light beam having a cross section having a length and a width on the detection object (7) such that the length extends parallel to a direction of movement (x coordinate) of the detection object (see Figs. 2B-C), a light receiver (9, i.e., photo detector, col. 4, line 44) receiving a reflection of the light beam from the detection object, a storage unit (22, i.e., cpu) for storing first output waveform signals from the light receiver at a first time and storing second output waveform signals from the light receiver at a second time, and a movement detecting unit detecting an amount of shift between the first output waveform

signals and second output waveform signals and determining a movement amount of the detection object based on the detected amount of shift (col. 1, lines 56-63 and col. 2, lines 1-12).

Regarding claim 11, Ueda shows in Figs. 1A-B, 2A, and 2B-C, a method of optically detecting amount of movement of an object comprising the steps of: projecting light (beams 5a-b or 14a-b) against the object (7) to form a generally rectangular image having a length and a width such that the length aligned with a direction of movement (x coordinate) of the object; detecting first reflection the generally rectangular image from the object at first time and outputting first waveform (5a) signals related to the first detected reflection (14a); detecting a second reflection of the generally rectangular image from the object at a second time and outputting second waveform signals (5a) related to the second detected reflection (14a); measuring an amount of waveform shift between the first output waveform and the second output waveform signals an amount of object shift between the first time and the second time.

Regarding claim 12, Ueda shows in Fig. 2A a method of deflecting the first reflection of the generally rectangular image.

Regarding claim 13, Ueda discloses a method of multiplying a part of the first output waveform signals (5a) and a part of the second output waveform signals (5b) (col. 7, lines 2-5) a plurality of coefficients according to a light intensity distribution of the linear beam with respect to longitudinal direction of the linear beam (see formulas 1-8), and correcting the light intensity distribution of the linear beam with respect the longitudinal direction (col. 1, lines 56-63 and col. 2, lines 1-34).

Regarding claim 14, Ueda discloses a method of determining correlation coefficients between first output waveform partial signals outputted at the first time point from a first partial area corresponding to a part of the reflected image of the linear beam with respect to the longitudinal direction and a plurality of sets of second output waveform partial signals outputted at the second time from plurality partial areas corresponding to a plurality of parts of the image of the linear beam (see formulas 4-8); determining a second partial area from the plurality of partial areas that results in a highest correlation coefficient at the second time, and calculating the amount movement of the object based on the shift between the first partial area and the second partial area (see formula 3 and 8, and col. 6, lines 34-51).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ueda (U.S. Patent No. 5,796,470) in view of Okada (U.S. Patent No. 6,754,246 B2).

Regarding claim 2, Ueda discloses the claimed invention as stated above. Ueda does not explicitly disclose that the light emitter is composed of a plurality of semiconductor laser devices disposed linearly. Okada shows in Fig. 1B a light emitter (1, i.e., light source apparatus) composed of a plurality of semiconductor laser devices

(2, i.e., semiconductor laser arrays) disposed linearly. It would have been obvious to one skilled in the art to provide a light source apparatus such as disclosed in Okada to the device of Ueda for the purpose of improving overall parallelism of the laser beams, thus improving focusing performance of the device.

5. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ueda (U.S. Patent No. 5,796,470) in view of Costanza (U.S. Patent No. 5,204,620).

Regarding claim 9, Ueda discloses the claimed invention as stated above. Ueda does not disclose a conveying section conveying the detection object, and a controller for controlling the conveying section so as to align with a target position after conveyance, on basis of moving amount of the detection position of the detection object that is detected by the optical moving amount detecting device. Costanza shows in Figs. 1, 3 and 5, a conveyance processing system (photoreceptor belt) comprising: a conveying section (I_1, I_2, I_3 or I_m) conveying the detection object, and a controller (35, i.e., belt servo controller) for controlling the conveying section so as to align with a target position after conveyance, on basis of moving amount of the detection position of the detection object that is detected by the optical moving amount detecting device (see Fig. 5). It would have been obvious to one skilled in the art to provide the photoreceptor belt of Costanza to the apparatus of Ueda, for the purpose of providing the continuous motion needed for object's velocity measurements.

Allowable Subject Matter

6. Claim 6 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. The following is a statement of reasons for the indication of allowable subject matter:

Claim 6 has allowable subject matter because the prior art fails to disclose or make obvious, either singly or in combination, an optical moving amount detecting device comprising, in addition to the other recited features of the claim, "wherein a size of the first partial area of the light receiver such that the first output waveform partial signals outputted from the first partial area can be discriminated from signals outputted at the first time point from areas other than the first partial area the light receiver and wherein a size of a whole area the light receiver is not smaller than a sum of the size of the first partial area and of a moving amount of an image of the linear reflected beam which amount corresponds to a predetermined moving amount of the detection object."

Response to Arguments

8. Applicant's argument's filed 06/07/2006 have been fully considered but they are not persuasive.

In response to applicants arguments that does not rely on differences in frequency from Doppler effect and that the apparatus disclosed in Ueda does not make measurements over two points in time, Ueda discloses all of the limitations of the

rejected claims in addition to employing the Doppler frequency in its measurements, and Ueda makes at least two measurements over two points in time by in order to calculate the velocity of the object (7).

In response to applicant's arguments that Ueda's lens units 11,12 do not form a linear beam having length and width, the length extending in parallel with a direction of movement of a detection object, the examiner disagrees. As understood, since the beam is spread along the moment direction, the length is extended as claimed.

In response to applicant's arguments that Ueda's cpu is not disclosed as storing first output waveform signals that are outputted from the light receiver receiving the linear reflected beam at a first time point and storing second output waveform signals that are outputted from the light receiver at a second time point, and that Ueda's beam 5a is not the output of the photodetector 9, and thus does not constitute an output waveform signal that is output from light receiver, the examiner acknowledges that cpu is not explicitly disclosed in Ueda as the storage means. However, the examiner clarifies that the signal processor provides the storage unit. Ueda discloses in col. 11, lines 1-7 a signal processor which calculates the velocity of the object from the frequency, indicating that a storage means is inherent to the signal processor in order to calculate velocity.

In response to applicant's arguments that Brosnan fails to teach a first optical that casts a linear beam on the detection object, the examiner agrees. The detection object (24, i.e., sensor) in Brosnan shown in Fig. 1, since the emission points of local oscillator

(30) disclosed in col. 5, lines 34-37, indicate that the beam is two dimensional. Therefore, the examiner withdraws the 102 rejection of claims 1, 3-6 and 10.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Wyatt whose telephone number is (571)-272-5974. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on (571)-272-2328. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

K.W.

K.W.

Georgia Epps

Georgia Epps
Supervisory Patent Examiner
Technology Center 2800